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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,176	01/10/2005	Anthony Matthew Johnston	03164.0172USWO	5345

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EXAMINER	
PATEL, VINIT H	
ART UNIT	PAPER NUMBER
1764	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,176	JOHNSTON ET AL.	
	Examiner	Art Unit	
	Vinit H. Patel	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *19Nov04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-6 and 10-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Loffler et al., US Pub. 20020071797.

Regarding the following claims, Loffler teaches:

1. A chemical reactor [0030] comprising: a) a core composed of at least one stack of metal plates [0030] bonded in face-to-face relationship (Fig. 1) b) a plurality of reaction zones A, B located within the core [0032] c) a plurality of catalyst receiving zones (bi-catalyst plates) located within the core [0032] d) a first channel 40 (gas flow channels) [0035] arrangement provided in at least some of the plates 1, 2 (Figs. 1 and 2) for transporting a first reactant to and between the reaction zones A, B, portions of the first channel arrangement that interconnect the reaction zones being formed over at least a portion of their length as heat exchange channels (Figs. 1 and 2), e) a second channel 40 (recognizing that several different channels are labeled as 40 in Fig. 2, thus equivalent to the claimed second channel) arrangement provided in at least some of the

plates 1, 2 and arranged to deliver a second reactant to each of the reaction zones (Fig. 2), and f) a third channel 40 arrangement provided in at least some of the plates for transporting a third reactant to and between the catalyst receiving zones (Fig. 2), portions of the third channel arrangement that interconnect the catalyst receiving zones [0037] being formed over at least a portion of their length as heat exchange channels that are positioned in heat exchange proximity to the heat exchange channels of the first channel arrangement (Figs. 1 and 2, [0030-0037].

2. The chemical reactor as claimed in claim 1 wherein the core comprises a single stack of metal plates 10,12 which are diffusion bonded (joined by brazing) in face-to-face contacting relationship (Fig. 3) [0040].

3. The chemical reactor as claimed in claim 2 wherein each of the reaction zones B is defined by aligned apertures 42 in adjacent plates 1 of the stack (Fig. 1).

4. The chemical reactor as claimed in claim 2 wherein each of the catalyst receiving zones (bi-catalyst plates) [0032] is defined by aligned apertures 42 in adjacent plates of the stack (Fig. 1).

5. The chemical reactor as claimed in claim 2 wherein the reaction zones A are arranged to constitute combustion zones [0032].

6. The chemical reactor as claimed in claim 2 wherein the reaction zones A are charged with a catalyst that is selected to provide for catalytic combustion of the first and second reactants [0032].

10. The chemical reactor as claimed in claim 1 wherein the reaction zones A, B are arrayed in two parallel rows and the first channel 40 arrangement extends linearly

between the reaction zones A, B (Fig. 1).

11. The chemical reactor as claimed in claim 10 wherein the catalyst receiving zones (bi-catalyst plates) [0032]. are arrayed in three parallel rows (Fig. 1), one of which is located between the rows of reaction zones A, B and the other two of which are located outside of the rows of reaction zones A, B (Fig. 1).

12. The chemical reactor as claimed in claim 1 when in the form of a reformer (Fig. 1) that is suitable for use in association with a fuel cell [0004].

13. The chemical reactor as claimed in claim 2 when embodied in a fuel processor having a reformer stage that incorporates the reaction zones B, when in the form of conduction zones (Fig. 1, conduction of gases), and the catalyst receiving zones (bi-catalyst plates) [0032].

14. The chemical reactor as claimed in claim 2 when embodied in a fuel processor for use in association with a proton exchange membrane fuel cell [0004], the fuel processor having a reformer stage that incorporates the reaction zones B, when in the form of conduction zones (Fig. 1, conduction of gases), and the catalyst receiving zones (bi-catalyst plates) [0032].

15. The chemical reactor as claimed in claim 13 wherein the fuel processor, of which the reactor forms a part, incorporates at least one pre-reformer stage (combustion stage A) incorporating at least one of the catalyst receiving zones (bi-catalyst plates) [0032].

16. The chemical reactor as claimed in claim 15 wherein the fuel processor incorporates at least one pre-reformer A (Fig. 1) that is arranged to be heated by a hot

syngas (heat exchange step wherein syngas utilized to heat A) [0051].

17. The chemical reactor as claimed in claim 15 wherein the fuel processor incorporates at least one pre-reformer A (Fig. 1) that is arranged to be heated by hot flue gas (heat exchange step) directed through a portion of the third channel 40 arrangement [0051].

18. A method of effecting a chemical reaction in a chemical reactor as claimed in claim 1 and which comprises the steps of: directing a first reactant into and serially through the reaction zones in the chemical reactor by way of the first channel 40 (Fig. 1) arrangement (Fig. 6) [0068], directing a second reactant in parallel feeds into the reaction zones by way of the second channel 40 arrangement (Figs. 1 and 6, see arrows indicating flow through respective passages) [0032,0068], the second reactant being selected to react exothermically with the first reactant in the respective reaction zones A, B (Fig. 1), and concurrently directing a third reactant into and serially through a catalyst contained in the catalyst receiving zones by way of the third channel 40 arrangement and, exposing the reactant to heat from the product of the exothermic reaction in its passage through the heat exchange channels of the first channel arrangement [0032, 0051, 0068].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loffler et al., US Pub. 20020071797.

Regarding the following claims, Loffler teaches :

7. The chemical reactor as claimed in claim 2, and further teaches that positioning of the plates may be arranged as desired [0047], but does not explicitly wherein the plates are stacked in repeating groups of six superimposed plates, with the first and fourth plates being formed with the first channel arrangement for transporting the first reactant to and between the reaction zones, the second and fifth plates being formed with the second channel arrangement for delivering the second reactant to the reaction zones and the third and sixth plates being formed with the third channel arrangement for transporting the third reactant to and between the catalyst receiving zones. However such arrangement is a mere rearrangement of parts, and absent any change to the operation of the apparatus, would have been obvious to one of ordinary skill in the art at the time of the invention. See MPEP 2144.

8. The chemical reactor as claimed in claim 7 wherein the second and fifth plates (as detailed in [0036], plates 2, 3, have greater thickness than plate 1) have a thickness that is less than that of the other plates in each group (Fig. 2).

9. The chemical reactor as claimed in claim 7, but does not explicitly disclose wherein channel elements that form the second channel arrangement have a cross-sectional area that is smaller than that of channel elements that form the first and third channel arrangements. However, such differences between Loffler and the claimed

invention are mere limitations relating to relative dimensions, not sufficient to patentably distinguish the claims from the prior art and would have been obvious to one of ordinary skill in the art at the time of the invention for the purpose to provide desired gas flow characteristics during operation of the reactor. See In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984) (Where the difference between the prior art and the claimed apparatus is a recitation of relative dimensions and would not perform differently than the prior art apparatus, the claimed device is not patentably distinct from the prior art).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vinit H. Patel whose telephone number is (571) 272-0856. The examiner can normally be reached on 9:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

vhp

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